

*Beamline Controls at the IPNS**

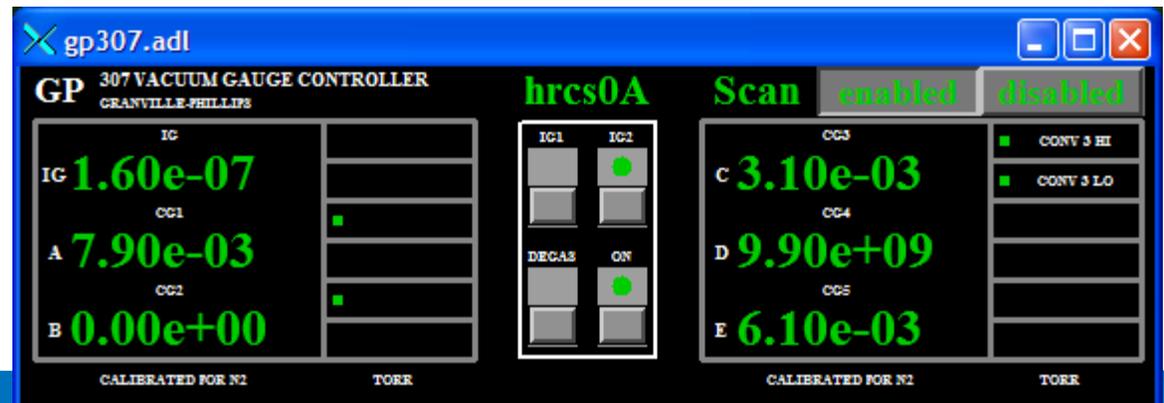
R.R. Porter, J.P. Hammonds, C. Piatak, Argonne National Laboratory

* The Intense Pulsed Neutron Source (IPNS) at Argonne National Laboratory is a national facility for neutron scattering research. IPNS is operated by the University of Chicago for the United States Department of Energy. It is available to outside users through the submission of research proposals. Proposals are reviewed semiannually by a Program Advisory Committee. IPNS has been in operation since 1981.

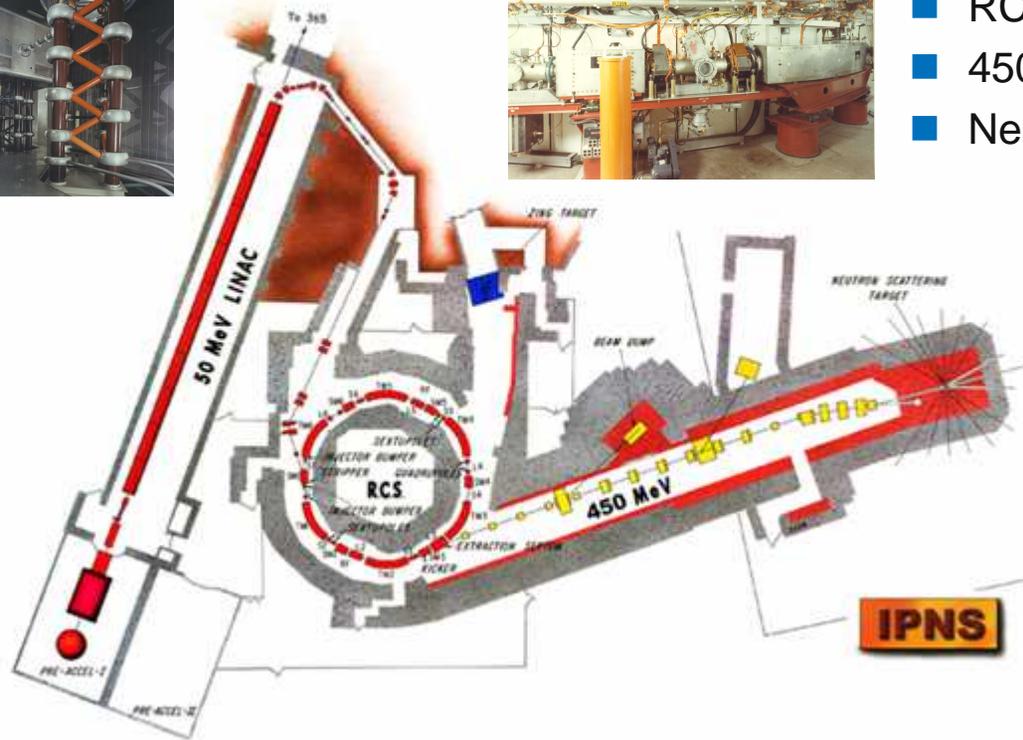


Introduction

- Intense Pulsed Neutron Source at Argonne National Laboratory
 - Facility
 - EPICS Controlled Beamlines
 - ISAW – Integrated Spectral Analysis Workbench
- Hardware
- Upgrade from 3.13 to 3.14
 - Move to SynApps
 - Upgrade Site Specific Drivers
- Convert drvAscii to streamDevice
- Current Serial Support



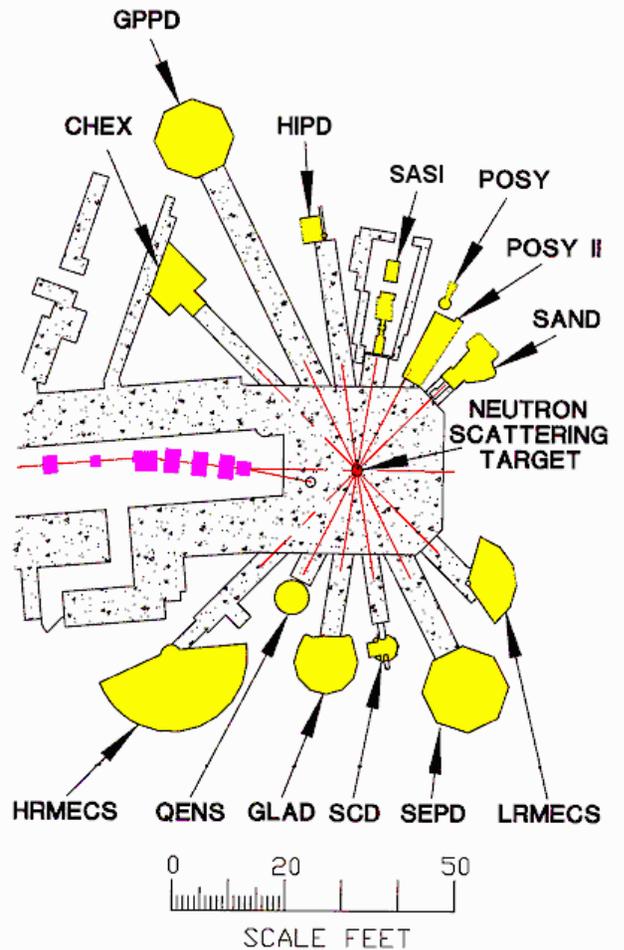
Facility



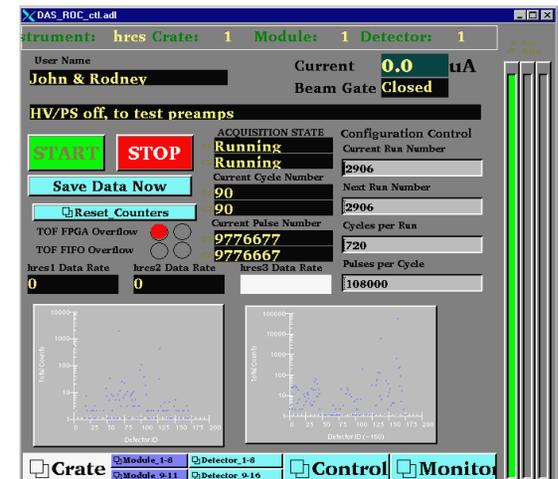
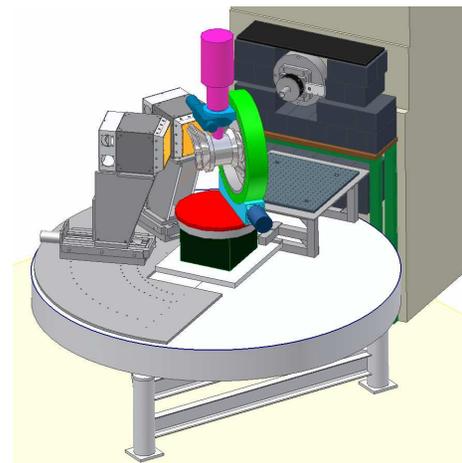
- 50 MeV LINAC (1961)
- RCS – Rapid Cycling Synchrotron (1977)
- 450 MeV Transport Line
- Neutron Scattering Target (1981)



EPICS Controlled Beamlines



- HRMECS – High-Resolution Medium-Energy Chopper Spectrometer (1998-2002)
- SCD – Single Crystal Diffractometer (2003)
- SAND – Small-Angle Neutron Diffractometer (2003)
- SASI – Small-Angle Scattering Instrument (2004)
- Powder Diffractometers
 - HIPD – High Intensity (2004)
 - GPPD – General Purpose (2004)
 - SEPD – Special Environment (2005)



ISAW – Integrated Spectral Analysis Workbench

- Data Visualization
 - Data Verification
 - Hardware Debugging
- Run File Set-up
- Data Visualization

Additional Acknowledgements for ISAW:

T.G. Worlton, IPNS

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The screenshot displays the ISAW software interface. The main window, titled '12:H1_hrcs3293', shows a 3D visualization of a bone sample with a red crosshair and a circular track. The interface includes a menu bar (File, Edit, View, Options) and a toolbar. The right-hand side features a control panel with sliders for X Scale, Brightness, View Control (Altitude, Azimuth, Distance), and Auto-Scale. Below the main window, a smaller window shows a 2D spectral plot with a peak labeled 'ID_37'. An 'scdrunfile' dialog box is open, allowing the user to enter a username, run title, and select a run type (Time-Of-Flight). The dialog also includes an 'Is Displex Used' checkbox and 'Apply' and 'Exit' buttons.

Operation scdrunfile

Enter Username: Your Name
Enter Run Title: Your Title
 Is Displex Used
Run Type: Time-Of-Flight

Result

Apply Exit

Image Data	
Time(us)	1,896.172
Counts	1
Channel	745
E Loss(m...)	177.95
E(meV)	23.261
$\lambda(\text{\AA})$	1.875

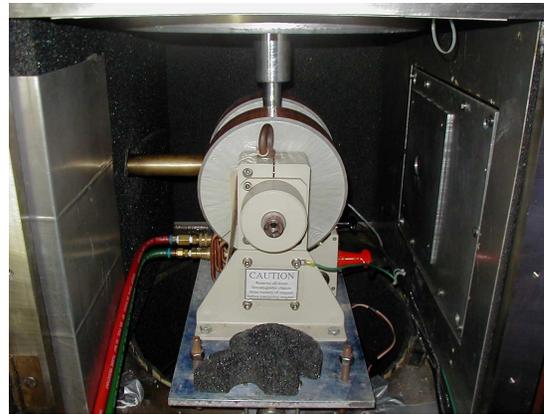
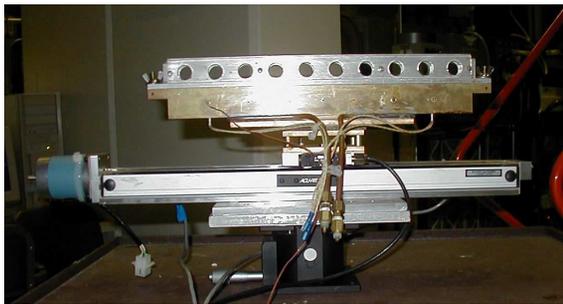
Graph Data	
Time(us)	1,896.853
Counts	1,487
Channel	745
E Loss(m...)	177.967
E(meV)	23.244

<http://www.pns.anl.gov/computing/isaw/>



Hardware

- VME - Tracewell & Wiener VME Crates
 - Acromag 9440, 9470 Digital I/O
 - IPNS Timing & Delay Board
 - ISEG VHQ20n HV Power Supplies
 - MVME 167, 172lx, 2304, 5500
 - OMS VME58-E Motor Controller
 - ACS Motor Drivers
 - Xycom 530/531 Analog Output
 - Xycom 566 Analog Input
- VXI - Agilent E8403E VXI Crates
 - MVME 2304, 5500
 - IPNS ROC Module
 - IPNS TOF Module
- Port Server – Digi PortServer TS16
 - Temperature Controllers
 - Eurotherm 905
 - LakeShore 330, 332, 340
 - PolyStat Recirculator
 - Magnet Controllers
 - Cryomagnetics CS-4 (in development)
 - EMS Power Supply
 - Oxford IPS, ITC, ILM
 - Vacuum Gauge Controllers
 - Granville-Phillips 307, 316





Upgrade from 3.13.7 to 3.14.8.2

- Move to SynApps
 - Acromag 9440
 - Autosave
 - genSub
 - ipac
 - Motor
 - Scalc
- Upgrade Site Specific Drivers
- Upgrade to Asyn - Options
 - Convert drvAscii to use Asyn
 - Write Asyn specific drivers
 - StreamDevice



Upgrade from 3.13 to 3.14 - drvAscii to streamDevice

Db

- Copy <name>.db to <name>Stream.db
- Use vi to edit <name>Stream.db
- VDCT: Change .dbd file as needed
- Use global replace to change DTYP, typing:
:g/"Ascii SIO"/s/"stream"/g
- Remove drvAscii Specific Records
 - slope
 - connect, connectSts, debug
 - timeout
 - writeCmt
 - readCmt
- Add asyn record
 - Replaces connect, connectSts, debug
- Edit INP and OUT fields
 1. field(INP, "@\$(PORT) {\x04\$(ADDR)II}{\x02II}>%s}")
 2. field(INP, "@euthm.proto hex\$(ADDR),,II) \$(PORT)")
 1. field(OUT, "@\$(PORT) <\x04\$(ADDR)\x021XP%f><\x06>")
 2. field(OUT, "@euthm.proto set1f\$(ADDR),1,XP) \$(PORT)")

Stream protocol file

```
#####  
# Eurotherm 800/900/2000 Series Controller Protocol File  
# $1 = Address = (GID)(GID)(UID)(UID), i.e. 0011  
# $2 = Loop = (CN), i.e. 1 for Loop 1, 2 for Loop 2, and 3 for Programmer  
# $3 = Command Mnemonic = (C1)(C2), i.e. II  
#####  
STX = "\x02";  
ETX = "\x03";  
ENQ = "\x05";  
# EOT = "\x04"; ACK = "\x06"; defined in streamDevice  
  
#InTerminator = CR LF; from readCmt if used  
#OutTerminator = CR LF; from writeCmt if used  
#ReplyTimeout = 10000; (milliseconds) from timeout (s) if used  
  
#####  
# Eurotherm Commands  
set1f {  
# Write Numbers in the Range from 0.0 to 9999.9, set precision if slope used.  
out EOT "\$1" \$STX "\$2" "\$3" "%2.1f" $ETX "%6<XOR>"; in ACK;  
# @init { out EOT "\$1" "\$2" "\$3" $ENQ; in $STX "\$2" "\$3" "%f" $ETX "%1<XOR>";}  
}  
hex {  
out EOT "\$1" "\$2" "\$3" $ENQ;  
in $STX "\$2" "\$3" ">[A-F0-9]" $ETX "%1<XOR>";  
}
```



Upgrade from 3.13 to 3.14 - drvAscii to streamDevice cont.

st.cmd

- Start-up Command File (st.cmd)
 - Remove tnetDev Configuration
 - Remove drvAscii Configuration
 - Define ports with Asyn
 - Define protocol path
 - Load library, databases and records per 3.14 standard

```
# tnetDev Configuration
hostAdd ("dlab", "192.168.1.251");
tnetDevCreate ("/pty/tserv8.", "dlab", 2008)
```

```
# drvAscii Configuration
drvAsciiSetTxFunc("/pty/tserv11.M", putFrameEIBisynch)
drvAsciiSetRxFunc("/pty/tserv11.M", getFrameEIBisynch)
#drvAsciiDebugLevel=11
```

```
# Asyn Configuration.
#drvAsynSerialPortConfigure("L0", "/tyCo/1", 0, 0, 0)
drvAsynIPPortConfigure("L8", "192.168.1.251:2108", 0, 0, 0)
```

```
#asynSetTraceMask("L8", -1, 0x1f)
#asynSetTraceIOMask("L8", -1, 0x2)
#asynSetTraceFile("L8", -1, "")
asynReport()
```

```
# StreamDevice Configuration.
cd top
epicsEnvSet("STREAM_PROTOCOL_PATH", "protocols")
```

Current Serial Support

et905main.adl

EUROTHERM IPNS 900 EPC

VETO	Delay	1.88	Min
PV - 1	22.70	Celsius	
WSP - 1	999.0	Celsius	
OP - 1	70.00	%	
PV - 1	22.70	Celsius	

P = 25.30 I = 10.00 D = 2.00
 Cutback Low 25.30 High 1.00
 Set Point Rate 50.00 C/Min Off
 Power Rate 50.00 %/Min Off
 Operational Reverse

porter Miller Furnace

Setpoint 999.00 Celsius
 Lower Limit 20.00 Celsius
 Upper Limit 100.00 Celsius
 Delay enabled 2.00 Minutes
 Scan Enable

Tune Zone Loop

et905tune.adl

EUROTHERM IPNS 900 EPC

VETO	Delay	1.00	Min
PV - 1	21.90	Celsius	
WSP - 1	999.0	Celsius	
OP - 1	70.00	%	
PV - 1	21.90	Celsius	

P = 25.30 I = 10.00 D = 2.00
 Cutback Low 25.30 High 1.00
 Set Point Rate 50.00 C/Min Off
 Power Rate 50.00 %/Min Off
 Operational Reverse

porter Miller Furnace

Sensors: Control A B Measure A B
 P = 25.25 I = 0.00 D = 0.00
 Cutback Low = 0.00 High = 1.00
 Set Point: Rate Limit 0.00 C/Min
 Minimum 0.00 Celsius
 Maximum 1370.00 Celsius
 Output: Power 0.00 % of Full Power
 Rate Limit 0.00 %/Min
 Maximum 0.00 % Full Power
 Mode Filter Control
 Operational Off Reverse

Main Zone Loop

et905loop.adl

EUROTHERM IPNS 900 EPC

VETO	Delay	1.68	Min
PV - 1	21.10	Celsius	
WSP - 1	999.0	Celsius	
OP - 1	70.00	%	
PV - 1	21.10	Celsius	

P = 25.30 I = 10.00 D = 2.00
 Cutback Low 25.30 High 1.00
 Set Point Rate 50.00 C/Min Off
 Power Rate 50.00 %/Min Off
 Operational Reverse

porter Miller Furnace

Auto Off
 Local OP Limit
 Normal SP Limit
 Off Off
 Adaptive Tune Off
 Gain Scheduling Send Parameters

Process Input - Normal Remote Input - Normal
 No Error

Main Tune Zone

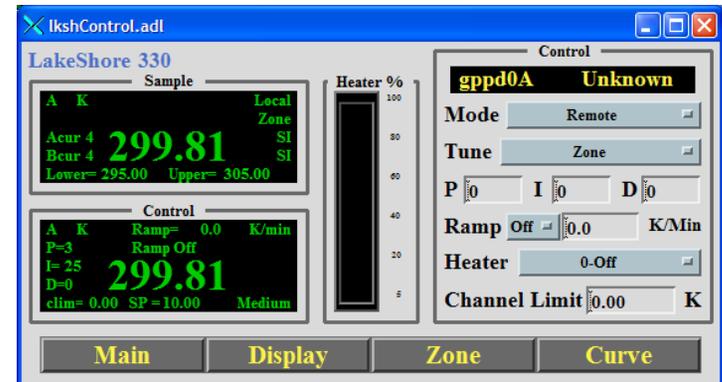
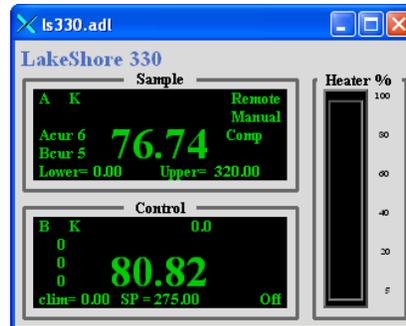
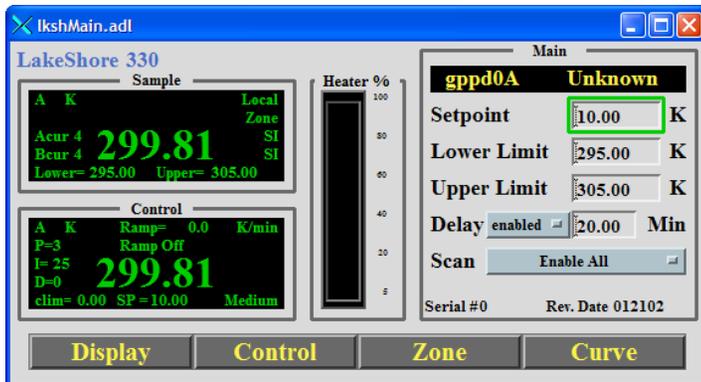
■ SNL

- Use existing support
- Minor changes to make OSI independent
- Instrument and connection identification
- Parameter translation

■ Medm

- Refactor displays

Current Serial Support – cont.



- Auto Detect Lakeshore Model
 - 332 sets 330 emulation mode
 - 340 scans separate records and display changes automatically

